WHAT WE CLAIM IS:

1. A computer-generated hologram designed to diffuse light having a given reference wavelength and incident thereon at a given angle of incidence in a specific angle range, characterized in that, in a range of wavelengths including said reference wavelength wherein zero-order transmission light or zero-order reflection light of incident light on said computer-generated hologram at a given angle of incidence is seen in white by additive color mixing, the maximum diffraction angle of incident light of the minimum wavelength in said range and incident at said angle of incidence is larger than the minimum diffraction angle of incident light of the maximum wavelength in said range and incident at said angle of incidence.

2. The computer-generated hologram according to claim 1, which comprises an array of two-dimensionally arranged minute cells, wherein each cell has an optical path length for imparting a unique phase to reflection light or transmission light, and a phase distribution obtained by adding a first phase distribution that substantially diffracts a vertically incident light beam within a given viewing region and does not substantially diffract the light beam toward other region to a second phase distribution that allows an obliquely incident light beam at a given angle of incidence to leave the cell vertically.

3. The computer-generated hologram according to claim 1, which comprise an array of two-dimensionally arranged minute cells, wherein each cell has an optical path length

for imparting a unique phase to reflection light or transmission light as well as a phase distribution which substantially diffracts an obliquely incident light beam at a given angle of incidence within a given viewing region and does not substantially diffract the light beam toward other region and which substantially diffracts a vertically incident light beam within another region shifted from said given viewing region and does not substantially diffract the light beam toward a region except for said another region.

4. The computer-generated hologram according to claim 2 or 3, wherein said cells are arranged in columns and rows just like checkers.

5. The computer-generated hologram according to any one of claims 1 to 4, wherein a reflective layer is provided on a relief pattern provided on a surface of the substrate.

6. The computer-generated hologram according to any one of claims 1 to 5, which is adaptable to the minimum wavelength of 450 nm and the maximum wavelength of 650 nm.

7. The computer-generated hologram according to any one of claims 1 to 6, which satisfies:

$$\lambda_{MIN}/\lambda_{MAX} \geq (\sin\beta_{1STD} - \sin\theta)/(\sin\beta_{2STD} - \sin\theta) \quad (11)$$

where θ is an angle of incidence of illumination light, λ_{MIN} is the minimum wavelength, λ_{MAX} is the maximum wavelength, β_{1STD} is the minimum diffraction angle at a given reference wavelength λ_{STD} and β_{2STD} is the maximum diffraction angle at the given reference wavelength λ_{STD}.

8. The computer-generated hologram according to any one of claims 1 to 6, which satisfies:

$$\sin\theta \geq (\lambda_{MAX} \sin\beta_{1STD} - \lambda_{MIN} \sin\beta_{2STD})/(\lambda_{MAX} - \lambda_{MIN}) \qquad (12)$$

where θ is an angle of incidence of illumination light, λ_{MIN} is the minimum wavelength, λ_{MAX} is the maximum wavelength, β_{1STD} is the minimum diffraction angle at a given reference wavelength λ_{STD} and β_{2STD} is the maximum diffraction angle at the given reference wavelength λ_{STD}.

9. A display system, which uses the computer-generated hologram according to any one of claims 1 to 8 as a reflector.

10. A reflective liquid crystal display, wherein the computer-generated hologram according to any one of claims 1 to 8 is disposed as a reflector on a back surface thereof.

11. A reflective liquid crystal display, wherein the computer-generated hologram according to any one of claims 1 to 8 is interposed as a reflector between a liquid crystal layer thereof and a back surface substrate thereof.

12. A computer-generated hologram comprising minute elemental hologram pieces closely arranged on a plane, wherein each elemental hologram piece has an optical path length enough to impart an identical phase distribution to reflection light or transmission light.

13. The computer-generated hologram according to claim 12 designed to diffuse light having a given reference wavelength and incident thereon at a given angle of incidence in a specific angle range, wherein, in a range of wavelengths including said reference wavelength wherein zero-order transmission light or zero-order reflection light incident on said computer-generated hologram at a given angle of

incidence is seen in white by additive color mixing, the maximum diffraction angle of incident light of the minimum wavelength in said range and incident at said angle of incidence is larger than the minimum diffraction angle of incident light of the maximum wavelength in said range and incident at said angle of incidence.

14. The computer-generated hologram according to claim 12 or 13, wherein each elemental hologram piece has a phase distribution obtained by adding a first phase distribution that substantially diffracts a vertically incident light beam within a given viewing region and does not substantially diffract the light beam toward other region to a second phase distribution that allows an obliquely incident light beam at a given angle of incidence to leave the elemental hologram piece vertically.

15. The computer-generated hologram according to claim 12 or 13, wherein each elemental hologram piece has a phase distribution which substantially diffracts an obliquely incident light beam at a given angle of incidence within a given viewing region and does not substantially diffract the light beam toward other region and which substantially diffracts a vertically incident light beam within another region shifted from said given viewing region and does not substantially diffract the light beam toward a region except for said another region.

16. The computer-generated hologram according to any one of claims 12 to 15, which comprises a resin layer including a hologram.

17. The computer-generated hologram according to claim 16, which further comprises a transparent substrate for supporting the resin layer including a hologram.

18. The computer-generated hologram according to any one of claims 12 to 17, which is defined by a relief pattern on a surface of a hologram-forming layer.

19. The computer-generated hologram according to claim 18, which further comprises an optical reflective layer stacked on and along said relief pattern.

20. The computer-generated hologram according to claim 18, wherein said optical reflective layer is laminated on the other bare surface of said hologram-forming layer which is free from said relief pattern.

21. A reflector which uses the computer-generated hologram according to any one of claims 12 to 20.

22. A reflective liquid crystal display, wherein the computer-generated hologram according to claim 21 is disposed on a back surface thereof.

23. A reflective liquid crystal display, wherein the computer-generated hologram according to claim 21 is interposed between a liquid crystal layer and a back substrate in said liquid crystal display.

24. A process for fabricating a computer-generated hologram by defining a range which diffraction light obtained by diffraction of incident light leaves, determining a hologram phase distribution for allowing said diffraction light to leave the defined range, quantizing a determined phase distribution to find a quantized depth of a hologram

relief, forming a relief on a substrate by photoetching on the basis of a found quantized depth to obtain a relief pattern, and patterning a resin layer using said relief pattern to form a hologram relief on a surface of said resin layer.

25. A process for fabricating a computer-generated hologram by defining a range which diffraction light obtained by diffraction of incident light leaves, determining a hologram phase distribution for allowing said diffraction light to leave the defined range, quantizing a determined phase distribution to find a quantized depth of a hologram relief and the number of steps of said depth, repeating photoetching given times corresponding to an obtained depth and the number of steps to form a relief pattern on an etching substrate, and patterning a resin layer using said relief pattern to form a hologram relief on a surface of said resin layer.

26. The computer-generated hologram fabrication process according to claim 24 or 25, wherein said phase distribution is determined per minute elemental hologram piece forming the hologram, and said relief is formed on the basis of a phase distribution obtained by repeatedly arranging a phase distribution of said elemental hologram piece across said substrate.

27. The computer-generated hologram fabrication process according to any one of claims 24 to 26, wherein an optical reflective layer is laminated on and along a relief side or other side of said resin layer.

28. The computer-generated hologram fabrication process according to any one of claim 24 to 27, wherein the number of steps L having the depth of said relief is the N-th power of 2 where N is the number of photoetching cycles.

29. A computer-generated hologram, wherein a blaze pattern of sawtoothed shape in section is formed on a back surface of a transparent substrate and a depth d of said blaze pattern is $d = \lambda/2n$ where λ is the wavelength of reference light and n is a light refractive index of a material forming said transparent plate.

30. A computer-generated hologram, wherein a blaze pattern of sawtoothed shape in section is formed on a back surface of a transparent substrate with N steps having differences in level and a depth d of said blaze pattern is $d = \lambda(N-1)/2nN$ where λ is a wavelength of reference light and n is a light refractive index of a material forming said transparent plate.

31. The computer-generated hologram according to claim 29 or 30, wherein an optical reflective layer is laminated on and along said blaze pattern formed on the back surface of said transparent plate.

32. The computer-generated hologram according to any one of claims 29 to 31, wherein a front surface of said transparent plate has been subject to antireflection treatment.

33. A reflector which uses the computer-generated hologram according to any one of claims 29 to 31.

34. The reflector according to claim 33, wherein a transparent adhesive layer is laminated on a front surface of said transparent plate.

35. A reflective liquid crystal display, wherein said front surface of the reflector according to claim 33 is in close contact with a back surface of said liquid crystal display.

36. A reflective liquid crystal display, wherein said front surface of the reflector according to claim 34 is laminated on a back surface of said liquid crystal display with said transparent adhesive layer interposed therebetween.

37. The reflective liquid crystal display according to claim 35 or 36, wherein a liquid crystal display device and said transparent plate in said reflector have a substantially identical light refractive index, or said liquid crystal display device, said transparent adhesive layer and said transparent plate in said reflector have a substantially identical light refractive index.

38. A reflective liquid crystal display, wherein the computer-generated hologram according to claim 33 is interposed between a liquid crystal layer and a back substrate in said liquid crystal display with a front surface of said computer-generated hologram opposite to said liquid crystal layer.

39. A reflective display, wherein said front surface of the reflector according to claim 33 is in close contact with a back surface of a light transmission display.